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Mathematical modeling of a dynamic thin plate deformation in acoustoelasticity problems

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Abstract

© Published under licence by IOP Publishing Ltd. The coupled problem of planar acoustic wave propagation through a composite plate covered with a second damping layer with a large logarithmic decrement of oscillations is formulated. The aerohydrodynamic interaction of a plate with external acoustic environment is described by three-dimensional wave equations and the mechanical behavior of a two-layer plate by the classical Kirchhoff-Love model. An exact analytic solution of the problem is found for the case of hinged support of the edges of a plate. On the basis of this, the parameters of the covering damping layer were found, under which it is possible to achieve a practically complete damping of the plate vibration under resonant modes of its acoustic loading.

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